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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Tsuyoshi YAMAMOTO, et al.

Serial No: 10/697,455

Confirmation No.: 7963

Filed: October 30, 2003

For: TILT CONTROL METHOD AND APPARATUS FOR OPTICAL DISC RECORDING AND PLAYBACK APPARATUS

Art Unit: 2627

Examiner: T. D. Alunkal

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APPEAL BRIEF

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Dear Sir:

This is an appeal from the Examiner's final rejection of claims 1-12. The final rejection issued on March 22, 2007, and the Notice of Appeal was sent to the Patent and Trademark Office on June 21, 2007.

TABLE OF CONTENTS

(i) REAL PARTY IN INTEREST

The real party in interest is Sanyo Electric Co. Ltd., Osaka, Japan.

(ii) RELATED APPEALS AND INTERFERENCES

None.

(iii) STATUS OF CLAIMS

Claims 1-12 are pending. In the final Office Action of March 22, 2007, claims 1-12 are rejected. Claims 1-12 are the claims being appealed.

(iv) STATUS OF AMENDMENTS

This appeal is being filed in response to the final rejection of March 22, 2007. Subsequently, Applicants filed a Response To Final Office Action and Statement of Substance of Interview on May 17, 2007. The Statement of Substance of Interview was in response to an interview summary in the final Office Action which referred to a telephonic interview of March 5, 2007 between the Examiner and the undersigned in which it was noted that an earlier Office Action of December 7, 2006 was not addressed to the attorneys of record, but rather to another law firm. Accordingly, the final Office Action of March 22, 2007 was mailed to the correct attorneys of record at the correct current address. On June 12, 2007, an Advisory Action issued stating that Applicants' Response To Final Office Action of May 17, 2007 fails to place the application in condition for allowance for reasons which are set forth on page 2 of the Advisory Action.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1

Claim 1 defines a tilt control method in an optical pickup 2 including a tilt adjustment coil 7 for adjusting the tilt of an objective lens (described at lines 9-11 of page 5), comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc 1 (described at lines 22-24 of page 8),

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil 7 (described at lines 18-23 of page 9);

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc 1 (described at lines 10-19 of page 10);

detecting the peak level in the RF signal of said offset adjustment signal that was played back (described at lines 9-20 of page 11); and

setting said driving signal level, when the detected peak level reaches a maximum, as an offset value for the driving signal to be supplied to the tilt adjustment coil 7 (described at lines 9-20 of page 11);

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil 7 (described at lines 10-15 of page 13).

Claim 2

Claim 2 defines a tilt control method according to claim 1, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil 7 (described at lines 7-10 of page 13).

Claim 3

Claim 3 defines a tilt control method in an optical pickup 2 including a tilt adjustment coil 7 (described at lines 9-11 of page 5) for adjusting the tilt of an objective lens, comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc 1 (described at lines 22-24 of page 8),

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil 7 (described at lines 18-23 of page 9);

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc 1 (described at lines 10-19 of page 10);

detecting the bottom level in the RF signal of said offset adjustment signal that was played back (described at lines 9-20 of page 11); and

setting said driving signal level, when the detected bottom level reaches a minimum, as an offset value for the driving signal to be supplied to the tilt adjustment coil 7 (described at lines 19 and 20 of page 11);

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil (described at lines 10-15 of page 13).

Claim 4

Claim 4 defines a tilt control method according to claim 3, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil 7 (described at lines 7-10 of page 13).

Claim 5

Claim 5 defines a tilt control method in an optical pickup 2 including a tilt adjustment coil 7 for adjusting the tilt of an objective lens (described at lines 9-11 of page 5), comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc 1 (described at lines 22-24 of page 8),

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil 7 (described at lines 18-23 of page 9);

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc 1 (described at lines 10-19 of page 10);

detecting the peak level and the bottom level in the RF signal of said offset adjustment signal that was played back (described at lines 9-20 of page 11); and

setting said driving signal level, when the difference between the detected peak level and bottom level reaches a maximum, as an offset value for the driving signal to be supplied to the tilt adjustment coil 7 (described at lines 9-20 of page 11);

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil 7 (described at lines 10-15 of page 13).

Claim 6

Claim 6 defines a tilt control method according to claim 5, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil 7 (described at lines 7-10 of page 13).

Claim 7

Claim 7 defines a tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup 2 (described at lines 9-11 of page 5) comprising:

a signal recording circuit 19 for recording a signal by irradiating light onto a disc via said objective lens (described at lines 11-16 of page 7);

a photo detector circuit 4 for obtaining an RF signal by detecting reflected light from the disc 1 via said objective lens (described at lines 2-5 of page 5);

a peak level detector circuit 12 for detecting the peak level of the RF signal from said photo detector circuit 4 (described at lines 16 and 17 of page 6);

a tilt adjustment coil 7 for controlling the tilt of said objective lens (described at lines 9-11 of page 5); and

a tilt control circuit 14 for controlling the driving signal level supplied to said tilt adjustment coil 7 (described at lines 14-25 of page 6);

an offset adjustment signal is written to the disc 1 by recording a signal to the disc 1 by said signal recording circuit 19 while said tilt control circuit 14 modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored (described at lines 22-27 of page 8 and lines 1 and 2 of page 9);

said photo detector circuit 4 detects an RF signal of the offset adjustment signal that was recorded on the disc (described at lines 10-19 of page 10);

the peak level detector circuit 12 detects the peak level of the RF signal in said offset adjustment signal (described at lines 20-27 of page 10 and line 1 of page 11); and

the tilt control circuit 14 detects the driving signal level of the tilt control coil corresponding to the maximum of the detected peak level and uses the

detected driving signal level as an offset value for tilt control (described at lines 14-25 of page 6);

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil 7 (described at lines 10-15 of page 13).

Claim 8

Claim 8 defines a tilt control apparatus according to claim 7, wherein:

said tilt control circuit 14 performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil 7 (described at lines 7-10 of page 13).

Claim 9

Claim 9 defines a tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup 2 (described at lines 9-11 of page 5) comprising:

a signal recording circuit 19 for recording a signal by irradiating light onto a disc via said objective lens (described at lines 11-16 of page 7);

a photo detector circuit 4 for obtaining an RF signal by detecting reflected light from the disc 1 via said objective lens (described at lines 2-5 of page 5);

a bottom level detector circuit 12 for detecting the bottom level of the RF signal from said photo detector circuit 4 (described at lines 16 and 17 of page 6);

a tilt adjustment coil 7 for controlling the tilt of said objective lens (described at lines 9-11 of page 5); and

a tilt control circuit 14 for controlling the driving signal level supplied to said tilt adjustment coil 7 (described at lines 14-25 of page 6);

an offset adjustment signal is written to the disc 1 by recording a signal to the disc 1 by said signal recording circuit 19 while said tilt control circuit 14 modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored (described at lines 22-27 of page 8 and lines 1 and 2 of page 9);

said photo detector circuit 4 detects an RF signal of the offset adjustment signal that was recorded on the disc (described at lines 10-19 of page 10);

the bottom level detector circuit 13 detects the bottom level of the RF signal in said offset adjustment signal (described at lines 20-27 of page 10 and line 1 on page 11); and

the tilt control circuit 14 detects the driving signal level of the tilt control coil corresponding to the minimum of the detected bottom level and uses the detected driving signal level as an offset value for tilt control (described at lines 14-25 of page 6);

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil 7 (described at lines 10-15 of page 13).

Claim 10

Claim 10 defines a tilt control apparatus according to claim 9, wherein:

said tilt control circuit 14 performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil 7 (described at lines 7-10 of page 13).

Claim 11

Claim 11 defines a tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup 2 (described at lines 9-11 of page 5) comprising:

a signal recording circuit 19 for recording a signal by irradiating light onto a disc via said objective lens (described at lines 11-16 of page 7);

a photo detector circuit for obtaining an RF signal by detecting reflected light from the disc 1 via said objective lens (described at lines 2-5 of page 5);

a peak level detector circuit 12 for detecting the peak level of the RF signal from said photo detector circuit 4 (described at lines 16 and 17 of page 6);

a bottom level detector circuit 12 for detecting the bottom level of the RF signal from said photo detector circuit 4 (described at lines 16 and 17 of page 6);

a tilt adjustment coil 7 for controlling the tilt of said objective lens (described at lines 9-11 of page 5); and

a tilt control circuit 14 for controlling the driving signal level supplied to said tilt adjustment coil 7 (described at lines 14-25 of page 6);

an offset adjustment signal is written to the disc 1 by recording a signal to the disc 1 by said signal recording circuit 19 while said tilt control circuit 14 modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored (described at lines 22-27 of page 8 and lines 1 and 2 of page 9);

said photo detector circuit 4 detects an RF signal of the offset adjustment signal that was recorded on the disc (described at lines 10-19 of page 10);

said peak level detector circuit 12 detects the peak level of the RF signal in said offset adjustment signal (described at lines 20-27 of page 10 and line 1 of page 11);

said bottom level detector circuit 13 detects the bottom level of the RF signal in said offset adjustment signal (described at lines 20-27 of page 10 and line 1 of page 11); and

the tilt control circuit 14 detects the driving signal level of the tilt control coil corresponding to the maximum of the difference between the detected peak level and bottom level and uses the detected driving signal level as an offset value for tilt control (described at lines 14-25 of page 6);

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil 7 (described at lines 10-15 of page 13).

Claim 12

Claim 12 defines a tilt control apparatus according to claim 11, wherein:

said tilt control circuit 14 performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil 7 (described at lines 7-10 of page 13).

(vi) THE GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The ground of rejection to be reviewed on appeal is the rejection of claims 1-12 under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication 2002/0060964 A1 of Park in view of U.S. Patent 6,434,096 of Akagi et al.

(vii) ARGUMENT REGARDING THE GROUNDS OF REJECTION

In rejecting claims 1-12 as unpatentable over Park in view of Akagi et al., Park is said to teach a tilt control method in an optical pickup including a tilt adjustment coil for adjusting the tilt of an objective lens. The reference is said to teach the various steps or elements of the claims except for (1) recording an offset adjustment signal in a test recording area provided on an optical disc, wherein the offset adjustment signal is recorded while modifying a driving signal level supply to the tilt adjustment coil, and (2) wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supply to the tilt adjustment coil.

Akagi et al. is said to teach (1) recording an offset adjustment signal in a test recording area provided on an optical disc wherein the offset adjustment signal is recorded while modifying a driving signal level supplied to the tilt adjustment coil, and (2) wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supply to the tilt adjustment coil. According to the Final Office Action of March 22, 2007, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Park's teachings with Akagi's teachings. The references are said to disclose methods for optical tilt control by way of offset signals. Therefore, according to the Final Office Action, it would have been obvious for one of ordinary skill in the art at the time the invention was made to store the offset signals on the optical disc, as taught by Akagi et al., because in doing so, complications such as memory loss and lack of memory space can be avoided, which would result in an inability to perform tilt control. Furthermore, and according to the Final Office Action, by not erasing the offset signals on the discs, tilt control for a plurality of discs can be continuously achieved without the need for recording the offset signal upon insertion of the discs. This reduces the time needed for tilt control set-up.

Independent claims 1, 3 and 5 include a limitation that an offset adjustment signal is recorded in a test recording area provided on an optical disc while a driving signal level supplied to the tilt adjustment coil is modified. In claim 1, for example,

the steps thereof include "recording an offset adjustment signal in a test recording area provided on an optical disc" and "wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustments coil". According to the Final Office Action, lines 40-45 of col. 12 and claim 33 of Akagi shows such limitations. However, such sections of the reference in fact describe that an offset amount is stored beforehand. Nowhere does Akagi disclose or suggest the feature in accordance with the present invention.

Moreover, while lines 28 and 29 of Akagi describe an offset detection section for detecting the offset of the tilt area signal, such reference does not disclose or suggest how the offset is detected.

Independent claims 7, 9 and 11 include a limitation that an offset adjustment signal is written to the disc by the recording circuit while the tilt control circuit modifies the driving signal level to the tilt coil, and the relationship between the driving signal level and the recording position is stored. Thus, in claim 7 for example, such claim includes the limitation "an offset adjustment signal is written to the disc by recording a signal to the disc by said signal recording circuit while said tilt control circuit modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored".

Again, Akagi teaches only that the Office Action of the tilt area signal is detected. Nowhere does such reference disclose or suggest the feature in accordance with the present invention, as noted.

According to the Advisory Action, the claim limitation "wherein said offset adjustment signal is recorded..." requires that the offset adjustment signal is recorded while modifying a drive signal supplied to the tilt adjustment coil. Lines 40-45 of col. 12 of Akagi disclose "The offset amount of the tilt error signal depending on the movement direction of the optical pickup is stored beforehand". The portion of the Akagi disclosure which relates to language "...depending on the movement direction of the optical pickup..." implies that the optica 1 pickup is moving, which in turn, requires that a driving signal be supplied to the tilt

adjustment coil to necessitate movement of the optical pickup. The fact that the offset amount is recorded beforehand does not change the fact that the offset signal is recorded while modifying a driving signal to the tilt adjustment coil. Further in accordance with the statements in the Advisory Action, according to the claims, the offset adjustment signal is first recorded. Only thereafter is playback of the offset signal required. Therefore, the claims require that the offset signal is recorded before. For these reasons, the Advisory Action concludes that Akagi et al. disclose the limitations noted above in independent claims 1, 3, 5, 7, 9 and 11 of the present application.

In response, it is pointed out that Akagi et al. shows recording a data signal in a recording area provided on an optical disc. The data signal is recorded while modifying the driving signal level supplied to the tilt adjustment coil in accordance with data stored in a memory. However, Akagi does not show setting the driving signal level, when the detected peak level reaches a maximum, as an offset value of the driving signal to be supplied to the tilt adjustment coil. Furthermore, Akagi shows detecting an amplitude of the tracking area signal but does not show detecting a peak level of an RF signal. Consequently, the present invention is significantly different from Akagi et al. even when combination with Park is attempted.

For the reasons set forth above, independent claims 1, 3, 5, 7, 9 and 11 are submitted to clearly distinguish patentably over the attempted combination of Park and Akagi. Claims 2, 4, 6, 8, 10 and 12 each depend from one of the independent claims and contain all of the limitations thereof. Therefore, these claims are also submitted to clearly distinguish patentably over the cited art.

CONCLUSION

It is therefore respectfully requested that the final rejection of claims 1-12 be reversed, and that such claims be determined to be allowable.

If there are any fees due connected with the filing in this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

Date: August 7, 2007

By: _____

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(viii) CLAIM APPENDIX

1. A tilt control method in an optical pickup including a tilt adjustment coil for adjusting the tilt of an objective lens, comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc,

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil;

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc;

detecting the peak level in the RF signal of said offset adjustment signal that was played back; and

setting said driving signal level, when the detected peak level reaches a maximum, as an offset value for the driving signal to be supplied to the tilt adjustment coil;

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil.

2. A tilt control method according to claim 1, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil.

3. A tilt control method in an optical pickup including a tilt adjustment coil for adjusting the tilt of an objective lens, comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc,

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil;

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc;

detecting the bottom level in the RF signal of said offset adjustment signal that was played back; and

setting said driving signal level, when the detected bottom level reaches a minimum, as an offset value for the driving signal to be supplied to the tilt adjustment coil;

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil.

4. A tilt control method according to claim 3, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil.

5. A tilt control method in an optical pickup including a tilt adjustment coil for adjusting the tilt of an objective lens, comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc,

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil;

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc;

detecting the peak level and the bottom level in the RF signal of said offset adjustment signal that was played back; and

setting said driving signal level, when the difference between the detected peak level and bottom level reaches a maximum, as an offset value for the driving signal to be supplied to the tilt adjustment coil;

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil.

6. A tilt control method according to claim 5, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil.

7. A tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup comprising:

a signal recording circuit for recording a signal by irradiating light onto a disc via said objective lens;

a photo detector circuit for obtaining an RF signal by detecting reflected light from the disc via said objective lens;

a peak level detector circuit for detecting the peak level of the RF signal from said photo detector circuit;

a tilt adjustment coil for controlling the tilt of said objective lens; and

a tilt control circuit for controlling the driving signal level supplied to said tilt adjustment coil;

an offset adjustment signal is written to the disc by recording a signal to the disc by said signal recording circuit while said tilt control circuit modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored;

said photo detector circuit detects an RF signal of the offset adjustment signal that was recorded on the disc;

the peak level detector circuit detects the peak level of the RF signal in said offset adjustment signal; and

the tilt control circuit detects the driving signal level of the tilt control coil corresponding to the maximum of the detected peak level and uses the detected driving signal level as an offset value for tilt control;

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil.

8. A tilt control apparatus according to claim 7, wherein:

said tilt control circuit performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil.

9. A tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup comprising:

a signal recording circuit for recording a signal by irradiating light onto a disc via said objective lens;

a photo detector circuit for obtaining an RF signal by detecting reflected light from the disc via said objective lens;

a bottom level detector circuit for detecting the bottom level of the RF signal from said photo detector circuit;

a tilt adjustment coil for controlling the tilt of said objective lens; and

a tilt control circuit for controlling the driving signal level supplied to said tilt adjustment coil;

an offset adjustment signal is written to the disc by recording a signal to the disc by said signal recording circuit while said tilt control circuit modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored;

said photo detector circuit detects an RF signal of the offset adjustment signal that was recorded on the disc;

the bottom level detector circuit detects the bottom level of the RF signal in said offset adjustment signal; and

the tilt control circuit detects the driving signal level of the tilt control coil corresponding to the minimum of the detected bottom level and uses the detected driving signal level as an offset value for tilt control;

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil.

10. A tilt control apparatus according to claim 9, wherein:

said tilt control circuit performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil.

11. A tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup comprising:

a signal recording circuit for recording a signal by irradiating light onto a disc via said objective lens;

a photo detector circuit for obtaining an RF signal by detecting reflected light from the disc via said objective lens;

a peak level detector circuit for detecting the peak level of the RF signal from said photo detector circuit;

a bottom level detector circuit for detecting the bottom level of the RF signal from said photo detector circuit;

a tilt adjustment coil for controlling the tilt of said objective lens; and

a tilt control circuit for controlling the driving signal level supplied to said tilt adjustment coil;

an offset adjustment signal is written to the disc by recording a signal to the disc by said signal recording circuit while said tilt control circuit modifies the

driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored;

said photo detector circuit detects an RF signal of the offset adjustment signal that was recorded on the disc;

said peak level detector circuit detects the peak level of the RF signal in said offset adjustment signal;

said bottom level detector circuit detects the bottom level of the RF signal in said offset adjustment signal; and

the tilt control circuit detects the driving signal level of the tilt control coil corresponding to the maximum of the difference between the detected peak level and bottom level and uses the detected driving signal level as an offset value for tilt control;

wherein the tilt angle of the optical pickup is changed by changing the level of the drive current supplied to the tilt adjustment coil.

12. A tilt control apparatus according to claim 11, wherein:

said tilt control circuit performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil.

(ix) EVIDENCE APPENDIX

None

(x) RELATED PROCEEDINGS APPENDIX

None